

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Roger Rast (Registration #45,853) on 12/01/2010.

The application has been amended as follows:

Claim 1 has been amended to recite:

A system for controlling network congestion, comprising: a device configured for communicating a sequence of packets over a network; means, within said device, for sending packets of a sequence in a back-to-back nature, wherein back-to-back packets are packets which are communicated, with no delay between the back of one packet and beginning of the next packet, one after another in a single burst within the sequence of packets; and means, within said device, for explicitly indicating which packets within said sequence of packets are being sent back-to-back, and for setting congestion control parameters for a sender in response to estimating network bandwidth based on the receipt, by a receiver, of explicit back-to-back packet indications that are placed within the modified header, by the sender, of the back-to-back packets; means for the receiver to control sender packet train size in response to bandwidth estimations by changing a rate value  $m$  at which receipt acknowledgements

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(ACKs) are communicated from the receiver to said sender, and in response to which the sender transmits a corresponding number of packets back-to-back; wherein said rate value  $m$  is the rate at which acknowledgements are communicated from the receiver to control the number of back-to-back packets to be sent by the sender; and wherein said rate value  $m$  is given as the number of back-to-back packets to be sent by the sender for each said acknowledgment (ACK) sent by the receiver[.]; wherein said receiver sends an acknowledgement (ACK) for every given number of data packet arrivals according to the rate of acknowledgements, rate value  $m$ , and in response to the rate of acknowledgements the sender transmits a given number of data packets back-to-back, the given number of packets to be sent back-to-back being determined by rate at which the sender receives the acknowledgements.

Claim 14 has been amended to recite:

A system for controlling network congestion, comprising: a device configured for communicating over a network; a processor within said device configured for controlling the sending and receiving of packets over said network; and programming configured for executing on said processor for, sending packets of a sequence in a back-to-back nature in a single burst in which there is no delay between the back of one packet and the beginning of the next packet, marking packets, in a sender, to explicitly indicate if they are sent back-to-back, by placing an indication in a modified header of the packet that is to be sent by the sender; estimating network bandwidth in response to receipt of said explicit indications of back-to-back packets to generate network bandwidth

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estimates, establishing congestion control parameters in response to said network bandwidth estimates; controlling the length of packet trains transmitted by the sender in response to modifying the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender to which the sender transmits a corresponding number of packets back-to-back; wherein said rate at which acknowledgements are communicated by the receiver is configured to control the number of back-to-back packets to be sent by the sender; and wherein said rate is given as the number of back-to-back packets to be sent by the sender for each said acknowledgment (ACK) sent by the receiver[.]; wherein said receiver sends an acknowledgment (ACK) for every given number of data packet arrivals according to the rate of acknowledgements, rate value  $m$ , and in response to the rate of acknowledgements the sender transmits a given number of data packets back-to-back, the given number of packets to be sent back-to-back being determined by rate at which the sender receives the acknowledgements.

Claim 26 has been amended to recite:

A system for controlling network congestion comprising: a device configured for communicating over a network; a processor within said device configured for controlling the sending and receiving of packets over said network; and programming configured for executing on said processor for, sending packets of a sequence in a back-to-back nature in a single burst in which there is no delay between the back of one packet and the beginning of the next packet, explicit marking of packets by a sender of the packets.

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which are sent back-to-back, by placing an indication in a modified header of the packets, estimating network bandwidth in response to receipt of explicit indications of back-to-back packets or utilizing back-to-back packet estimations, controlling the length of packet trains transmitted by the sender in response to altering the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender as based on estimated network bandwidth; wherein said rate at which acknowledgements are communicated by the receiver comprises the number of back-to-back packets to be sent by the sender; wherein said rate value  $m$  is given as the number of back-to-back packets to be sent by the sender for each said acknowledgment (ACK) sent by the receiver; wherein said receiver sends an acknowledgement (ACK) for every given number of data packet arrivals according to the rate of acknowledgements, rate value  $m$ , and in response to the rate of acknowledgements the sender transmits a given number of data packets back-to-back, the given number of packets to be sent back-to-back being determined by rate at which the sender receives the acknowledgements; and wherein the size of segments being sent is reduced a given number of bits from said maximum segment size (MSS), or the setting of at least one header bit is changed, for explicitly indicating by the sender to the receiver that said packets are being sent back-to-back.

Claim 27 has been amended to recite:

A method of using bandwidth estimation to improve transport control protocol (TCP) congestion control within a packet based network, comprising: marking each

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packet[[,]] explicitly by a sender[[,]] that is being sent back-to-back, from [[a]] the sender, to a receiver, by placing an indication in a modified header of the packet;

wherein packets of a sequence are in a back-to-back nature when sent in a single burst in which there is no delay between the back of one packet and the beginning of the next packet; estimating bandwidth in response to receiving packets from other senders which are explicitly marked as back-to-back packets; and communicating congestion control parameters to the sender in response to said bandwidth estimates; altering the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender as based on estimated network bandwidth whereby the sender transmits a corresponding number of packets back-to-back; wherein said rate at which acknowledgements are communicated by the receiver comprises the number of back-to-back packets to be sent by the sender; wherein said rate value  $m$  is given as the number of back-to-back packets to be sent by the sender for each said acknowledgment (ACK) sent by the receiver; wherein said receiver sends an acknowledgement (ACK) for every given number of data packet arrivals according to the rate of acknowledgements, rate value  $m$ , and in response to the rate of acknowledgements the sender transmits a given number of data packets back-to-back, the given number of packets to be sent back-to-back being determined by rate at which the sender receives the acknowledgements; and wherein the size of segments being sent is reduced a given number of bits from said maximum segment size (MSS) for explicitly indicating by the sender to the receiver that said packets are being sent back-to-back.

The following is an examiner's statement of reasons for allowance: While the limitations of marking packets and adjusting send rates of ACKs may be found in prior-art, the prior-arts do not show a system that utilizes marked packets to explicitly indicate that packets are (and how many are) being sent back by a sender; and then, based off of the explicit indications, explicitly adjust the ACK rate (by the receiver), in order to allow the sender be able to explicitly determine the desired rate at which the receiver wants the sender to transmit packets back-to-back.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH GREENE whose telephone number is (571)270-3730. The examiner can normally be reached on Mon - Thu, 8:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thu Nguyen can be reached on 5712726967. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLG

/DOHM CHANKONG/  
Primary Examiner, Art Unit 2452